

## CLAIMS

### What Is Claimed Is:

1. A method for non-destructive surface inspection and profiling of a material, comprising the steps of:
  - selecting an area of the material to be tested;
  - selecting a polymer mixture;
  - applying the selected polymer mixture to a surface in the selected area of the material;
  - allowing the applied selected polymer mixture to polymerize on the surface;
  - lifting the polymerized polymer mixture from the surface; and
  - processing the polymerized polymer mixture lifted from the surface to create usable information of the surface of the material.
2. The method of claim 1, further including the step of first applying the selected polymer mixture to a clear carrier before applying the polymer mixture to the surface.
3. The method of claim 2, further including the step of allowing the polymerized polymer mixture to form a mold of the surface to which it is applied.
4. The method of claim 3, further including the steps of passing light through the mold of the surface formed by the polymerized polymer mixture, and obtaining an image of the mold of the surface.
5. The method of claim 4, further including the step of selecting the polymer mixture from the family of vinyl copolymers, or polysulfides.

6. The method of claim 4, further including the step of selecting the polymer mixture from a vinyl copolymer mixed with a small quantity of a color dye or pigment.

7. The method of claim 4, further including the step of processing the image of the mold of the surface in a computer to selectively obtain depth of any surface pitting, measure areas of any surface pitting, measure distance between points of interest on the image, calculate theoretical loss of mass of the surface, and to calculate the percentage of differences between an ideal surface and the tested surface.

8. The method of claim 1, further including the step of selecting the polymer mixture from the family of vinyl copolymers or polysulfides.

9. The method of claim 8, further including the step of first applying the selected polymer mixture to a clear, flexible plastic carrier before applying the polymer mixture to the surface.

10. The method of claim 9, further including the step of allowing the selected polymer mixture to polymerize on the surface to which it is applied to form a mold of the surface, which mold has a flat surface where it is held on the clear, flexible plastic carrier.

11. The method of claim 10, further including the steps of passing light through the mold of the surface formed by the polymerized polymer mixture, and obtaining an electronic image of the mold of the surface.

12. The method of claim 11, further including the step of processing the image of the mold of the surface in a computer to selectively obtain depth of any surface pitting, measure areas of any surface pitting, measure distance between points of interest on the image, calculate theoretical loss of mass of the surface, and to calculate the percentage of differences between an ideal surface and the tested surface.

13. A method for non-destructive surface inspection and profiling of a material, comprising the steps of:

- selecting an area of the material to be tested;
- selecting a polymer mixture;
- applying the selected polymer mixture to a clear substrate;
- applying the selected polymer mixture by means of the clear substrate to a surface on the selected area of the material;
- allowing the selected polymer mixture to polymerize on the surface to form a mold;
- lifting the clear substrate and formed mold from the surface; and
- processing the formed mold of the surface to create usable information of the surface of the tested area.

14. The method of claim 13, further including the step of selecting the polymer mixture from a family of vinyl copolymers or polysulfides.

15. The method of claim 13, further including the steps of passing light through the formed mold of the surface to obtain an image of the surface, and processing the obtained image.

16. The method of claim 13, further including the step of selecting the polymer mixture from a family of vinyl copolymers, and adding a small quantity of a selected pigment or dye color thereto.

17. The method of claim 16, further including the steps of passing light through the formed mold of the surface to obtain an image of the surface, and processing the obtained image.
18. The method of claim 17, further including the step of processing the obtained image in a computer to selectively obtain selected parameters of the tested surface including: depth of any surface pitting, measure of areas of any surface pitting, measure of distance between points of interest on the obtained image, calculate theoretical loss of mass of the surface, and to calculate the percentage of difference between the tested surface and an ideal surface.
19. The method of claim 13, further including the steps of passing light through the formed mold of the surface to obtain an image of the surface, and processing the obtained image in a computer .

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20. A method for non-destructive surface inspection and profiling of a surface of a material, comprising the steps of:

selecting an area on the surface to be tested;

selecting a polymer mixture from a vinyl copolymer mixed with from 0.1% to 4% by mass of a selected dye or pigment color;

applying the selected polymer mixture to one-side of a clear, flexible, plastic carrier;

applying the one side of the clear, flexible plastic carrier with the selected polymer mixture thereon to the selected area;

allowing the selected polymer mixture to polymerize to form a mold of the surface to which it is applied; the formed mold having a flat surface where it is held on the clear, flexible plastic carrier;

lifting the clear, flexible plastic substrate and the formed mold from the surface;

passing light through the formed mold of the surface to form an image; and

processing the formed image in a computer to create usable information about the tested surface.